WHAT IS CLAIMED IS:

1. A power pooling apparatus for uniformly distributing sector loads in a mobile communication system, comprising:

a distributor for distributing signals output from a signal generator according to respective sectors;

a radio signal processor for performing signal processing to provide an output of the distributor to an antenna; and

an adaptive signal processor for determining a characteristic matrix of the distributor by using an output in a predetermined position on a signal processing path of the radio signal processor, and providing the characteristic matrix of the distributor to the distributor.

2. The power pooling apparatus of claim 1, wherein the predetermined position on a signal processing path of the radio signal is an output of a power amplifier.

3. The power pooling apparatus of claim 1, wherein the predetermined position on a signal processing path of the radio signal is an output of a combiner.

4. The power pooling apparatus of claim 1, wherein the predetermined position on a signal processing path of the radio signal is an output of the distributor.

5. The power pooling apparatus of claim 1, wherein the adaptive signal processor updates the characteristic matrix of the distributor by estimating a characteristic matrix on the signal processing path in a predetermined position of the signal processing path.

6. The power pooling apparatus of claim 5, wherein the characteristic matrix on the signal processing path is a characteristic matrix of a power amplifier existing on the signal processing path of the radio signal processor.

7. The power pooling apparatus of claim 5, wherein the characteristic matrix on the signal processing path is a characteristic matrix of a combiner existing on the signal processing path of the radio signal processor.

8. The power pooling apparatus of claim 1, wherein the radio signal processor comprises:

a power amplifier for amplifying signals output from the distributor; and

a combiner for combining the amplified signals with signals which are power-amplified in the same type as the signals output from the signal generator.

9. The power pooling apparatus of claim 8, wherein the radio signal processor further comprises a feedback path section for forming a feedback path from the combiner and the adaptive signal processor, and converting an output signal of the power amplifier and an output signal of the combiner into baseband signals.

10. The power pooling apparatus of claim 9, wherein the radio signal processor further comprises a calibrator estimating a transfer characteristic of the feedback path section and compensating output signals of the power amplifier and output signals of the combiner.

11. The power pooling apparatus of claim 9, wherein the feedback path section further comprises:

a multiplexer for multiplexing input/output signals of the combiner and a calibration test signal;

a frequency-down converter for down-converting an output signal of the multiplexer into a baseband signal; and

a converter for converting an analog signal down-converted by the frequency-down converter into a digital signal.

12. The power pooling apparatus of claim 1, wherein the adaptive signal processor comprises:

a memory for storing information necessary for initialization of an adaptive algorithm;

a calibration calculator for calibrating signals output from the radio signal processor;

an estimation matrix calculator for calculating a characteristic matrix on the signal processing path by using an initialization value received from the memory, output signals of the calibration calculator, and input signals and output signals of the distributor;

a control matrix calculator for calculating a next characteristic matrix of the distributor at a next time by receiving a value calculated by the estimation matrix calculator; and

a delay for delaying an output value of the control matrix calculator for a predetermined time.

13. The power pooling apparatus of claim 12, wherein the estimation matrix calculator receives a set of an input vector of the distributor, an output vector of the distributor and an output vector of the calibration calculator and information necessary for calculating the next characteristic matrix of the distributor, and calculating a characteristic matrix on the signal processing path by using a recursive least squares method (RLS).

14. The power pooling apparatus of claim 13, wherein the recursive least squares method comprises:

calculating $b_{i,k}$ defined as

$$b_{i,k}= b_{i,k-1}=(z_{i,k}- b_{i,k} y_{i,k}) y_{i,k}^{*}\frac{1}{P_{i,k}}$$

$$P_{i,k}=\lambda P_{i,k-1}+ | y_{i,k}|^{2}$$

estimating a characteristic matrix of an i^{th} power amplifier existing on the signal processing path of the radio signal processor at a k^{th} time, the characteristic matrix using the $b_{i,k}$ as an element value, wherein λ represents a forgetting factor, P represents a compensation matrix for phase variation, y represents an input vector of the power amplifier, and z represents an input vector of the combiner.

15. The power pooling apparatus of claim 14, wherein the recursive least squares method comprises:

calculating C_k defined as

$$C_{k}= C_{k-1}+(u_{k}- C_{k-1} z_{k}^{H}\frac{Q_{k-1}}{z_{k}^{H} Q_{k-1} z_{k}+\lambda}$$

$$Q_{k}= \lambda^{-1}(Q_{k-1}-\frac{Q_{k-1} z_{k} z_{k}^{H} Q_{k-1}}{z_{k}^{H} Q_{k-1} z_{k}+\lambda})$$

; and

estimating a characteristic matrix of the combiner existing on the signal processing path of the radio signal processor at a k^{th} time, the characteristic matrix using the C_k as an element value, wherein λ represents a forgetting factor, Q represents a compensation matrix for a variation in output order, z represents an input vector of the combiner, and u represents an output vector of the combiner.

16. The power pooling apparatus of claim 15, wherein the recursive least squares method comprises:

calculating A_{k+1} defined as

$$A_{k+1} = \alpha \ B^{-1}{}_k \ C^{-1}{}_k \text{ or } A_{k+1} = \alpha \ B^{-1}{}_k \ C^{+}{}_k$$

; and

calculating a next characteristic matrix of the distributor to be used at a $(k+1)^{th}$ time following the k^{th} time in accordance with the above equation by using the estimated $b_{i,k}$ and C_k, the characteristic matrix using the A_{k+1} as an element value, wherein α represents a gain of the power amplifier.

17. A power pooling method for uniformly distributing sector loads in a mobile communication system, comprising the steps of:

uniformly distributing signals output from a signal generator according to respective sectors;

performing radio signal processing on the distributed signals; and

determining a characteristic matrix of a distributor by using an output in a predetermined position on a radio signal processing path.

18. The power pooling method of claim 17, wherein the predetermined position on a radio signal processing path is an output of a power amplifier.

19. The power pooling method of claim 17, wherein the predetermined position on a radio signal processing path is an output of a combiner.

20. The power pooling method of claim 17, wherein the predetermined position on a radio signal processing path is an output of the distributor.

21. The power pooling method of claim 17, further comprising the step of updating the characteristic matrix of the distributor by estimating a

characteristic matrix on the radio signal processing path in a predetermined position of the radio signal processing path.

22. The power pooling method of claim 21, wherein the characteristic matrix on the radio signal processing path is a characteristic matrix of a power amplifier existing on the radio signal processing path.

23. The power pooling method of claim 21, wherein the characteristic matrix on the radio signal processing path is a characteristic matrix of a combiner existing on the radio signal processing path.

24. The power pooling method of claim 17, wherein the radio signal processing step comprises the step of:

amplifying, by a power amplifier, power of signals output from the distributor; and

combining, by a combiner, the amplified signals with signals which are power-amplified in the same type as the signals output from the signal generator.

25. The power pooling method of claim 24, wherein the radio signal processing step further comprises the step of converting the power-amplified signal and the combined signal into baseband signals.

26. The power pooling method of claim 25, wherein the radio signal processing step further comprises the step of compensating the power-amplified signal and the combined signal.

27. The power pooling method of claim 25, wherein the step of converting the power-amplified signal and the combined signal into baseband signals comprises the steps of:

multiplexing the power-amplified signal, the combined signal and a

calibration test signal;

down-converting the multiplexed signal into a baseband signal; and converting the down-converted analog signal into a digital signal.

28. The power pooling method of claim 17, wherein the step of determining a characteristic matrix of the distributor comprises the steps of:

storing information necessary for initialization of an adaptive algorithm;

calculating calibration signals for calibrating signals output from a radio signal processor;

calculating a characteristic matrix on the radio signal processing path by using the stored initialization value and the calibrated signals;

calculating a next characteristic matrix of the distributor by receiving the calculated value of the characteristic matrix on the radio signal processing path; and

delaying the calculated value of the next characteristic matrix of the distributor for a predetermined time.

29. The power pooling method of claim 28, wherein the estimation matrix calculation step comprises the step of receiving a set of an input vector of the distributor, an output vector of the distributor and an output vector of the calibration calculator and information necessary for calculating the next characteristic matrix of the distributor, and calculating a characteristic matrix on the radio signal processing path by using a recursive least squares method (RLS).

30. The power pooling method of claim 29, wherein the recursive least squares method comprises the steps of:

calculating $b_{i,k}$ defined as

$$b_{i,k} = b_{i,k-1} = (z_{i,k} - b_{i,k}\, y_{i,k})\, y_{i,k}^{*} \frac{1}{P_{i,k}}$$

$$P_{i,k} = \lambda P_{i,k-1} + |y_{i,k}|^{2}$$

estimating a characteristic matrix of an i^{th} power amplifier existing on the radio signal processing path of the radio signal processor at a k^{th} time, the characteristic matrix using the $b_{i,k}$ as an element value, wherein λ represents a forgetting factor, P represents a compensation matrix for phase variation, y represents an input vector of the power amplifier, and z represents an input vector of the combiner.

31. The power pooling method of claim 30, wherein the recursive least squares method comprises the steps of:

calculating C_k defined as

$$C_k = C_{k-1} + (u_k - C_{k-1} z_k^{H} \frac{Q_{k-1}}{z_k^{H} Q_{k-1} z_k + \lambda}$$

$$Q_k = \lambda^{-1} \left(Q_{k-1} - \frac{Q_{k-1} z_k z_k^{H} Q_{k-1}}{z_k^{H} Q_{k-1} z_k + \lambda} \right)$$

; and

estimating a characteristic matrix of the combiner existing on the radio signal processing path of the radio signal processor at a k^{th} time, the characteristic matrix using the C_k as an element value, wherein λ represents a forgetting factor, Q represents a compensation matrix for a variation in output order, z represents an input vector of the combiner, and u represents an output vector of the combiner.

32. The power pooling method of claim 31, wherein the recursive least squares method comprises the steps of:

calculating A_{k+1} defined as

$$A_{k+1} = \alpha \quad B^{-1}{}_{k} \quad C^{-1}{}_{k} \text{ or } \quad A_{k+1} = \alpha \quad B^{-1}{}_{k} \quad C^{+}{}_{k}$$

; and

calculating a next characteristic matrix of the distributor to be used at a $(k+1)^{th}$ time following the k^{th} time in accordance with the above equation by using the estimated $b_{i,k}$ and C_k, the characteristic matrix using the A_{k+1} as an element value, wherein α represents a gain of the power amplifier.